

# Work Order ID: 56800

March 10, 2010 12:56:02 PM



Page 1

Item ID: D407-667-105

Accept



Setup Start



Revision ID:

Item Name: Crosstube Fwd

Stop



Start Date: 10/03/2010 Start Qty: 1.00



Cust Item ID:

Required Date: 25/03/2010 Req'd Qty: 1.00



Customer:

Reference:

Approvals:

Process Plan: 10-8810

Date: 10-3-10

Tooling:

Date:

Run Start



QC:

Date:

SPC (Y/N):

Date:

Stop



Sequence ID/  
Work Center ID

Operation  
Description

Set Up/  
Run Hours

Draw  
Number

Draw  
Rev.

Plan  
Code

Accept  
Qty

Reject  
Qty

Reject  
Number

Insp.  
Stamp

Draw Nbr

Revision Nbr

D407-667-145

Rev C

100



DC

Document Control

DOCUMENT CONTROL

0.00

Memo

0.00

Photocopy bluefile and create labels as per PPP D407-667-105 CHG003

8/10/01/06

10/04/01

110



Packaging

Packaging

Packaging

Memo

0.00

0.00

1 - - 10-3-15

120



CNC Bend 2

CNC Alpha 160 Bender

BENDING MACHINE - CROSSTUBES

Memo

0.00

0.00

Bend tube as per Dwg D407-667-145 using CNC bender program 407-fw

14 10-03-17

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
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**NOTE:** Date & initial all entries

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QC:

Date:

SPC (Y/N):

Date:

Stop

Sequence ID/  
Work Center IDOperation  
DescriptionSet Up/  
Run HoursDraw  
NumberDraw  
Rev.Plan  
CodeAccept  
QtyReject  
QtyReject  
NumberInsp.  
Stamp

130

QC15- Crosstube Dimensional Check

0.00



QC

Memo

0.00

Quality Control

P 10-3.16 / 8.10.03/18

B56800 1

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

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Run Start



QC: \_\_\_\_\_ Date: \_\_\_\_\_ SPC (Y/N): \_\_\_\_\_ Date: \_\_\_\_\_

Stop



Sequence ID/  
Work Center ID

Operation  
Description

Set Up/  
Run Hours

Draw  
Number

Draw  
Rev.

Plan  
Code

Accept  
Qty

Reject  
Qty

Reject  
Number

Insp.  
Stamp

140

0.00



Crosstubes

Crosstubes

Memo

0.00

Crosstubes

1- scribe batch # inside of cuff

2-Drill pilot holes in tube using drill Jig DT8541 & DT8542 as per Dwg D407-667-145. Drill all (3) top holes.

3-Drill and Ream all holes in tube to finish size using drill Jig DT8541 & DT8542 as per Dwg D407-667-145 Check dimensions between holes on all four sides.

4-Flip tube and switch drilling Jigs from right to left, left to right. Locate Jigs off existing holes using "T" pins.

5-Drill pilot holes using drill Jig DT8541 & DT8542 as per Dwg 407-667-145. Drill only the top (2) holes.

6-Drill & ream the top (2) holes to finish size using drill Jig DT8541 & DT8542 as per Dwg D407-667-145

7-Drill Fwd rivet holes using drill Jig DT8787FWD as per Dwg D206-667-145. Note: Fwd side has 3x top holes.

8-Drill Aft rivet holes using drill Jig DT8787AFT as per Dwg D407-667-145.

9-C'sink holes as per Dwg D407-667-145. Allow rivet to sit below surface to compensate for paint.

10 -Deburr & Inspect for surface damage. Repair damage within limits as per Dwg D407-667-145

ulb  
10-03-23

AWM 10-3-23

W/O:		WORK ORDER CHANGES					
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Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

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DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
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10.03.13	140	DRILL PASSED THROUGH TO OTHER SIDE. MARKED OPPOSITE SIDE	GP 10.03.13 pe 081042	DRILL THROUGH. GET DSI FROM ENG BEFORE SHIPPING			GP 10.03.13 pe 081042	N/A

**NOTE:** Date & initial all entries

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Run Start



QC: \_\_\_\_\_ Date: \_\_\_\_\_ SPC (Y/N): \_\_\_\_\_ Date: \_\_\_\_\_

Stop



Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Draw Number	Draw Rev.	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
150  HandFXtube Hand Finishing Crosstubes	Crosstubes Chemical Conversion  Memo	0.00 0.00				1	-	-	Apr 10-3-23
160  QC Quality Control	QC3- Inspect Part Finish  Memo	0.00 0.00							8 10/03/24
170  QC Quality Control	QC5- Inspect part completeness to step on W/O  Memo	0.00 0.00							8 10/03/24

W/O:		WORK ORDER CHANGES					
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Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

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QC: \_\_\_\_\_ Date: \_\_\_\_\_ SPC (Y/N): \_\_\_\_\_ Date: \_\_\_\_\_

Run Start



Stop



Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Draw Number	Draw Rev.	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
180 	Outsource process - NDT per QSI038 4.1	0.00							
Outsource2	<b>Memo</b>	0.00							
Outsource process - NDT	OUTSIDE SERVICE -CROSSTUBES Liquid Penetrant Inspection as per QSI 038 Or Issue P/O: <u>11550</u> LPI as per ASTM 1417 Level 2 Attach copy of NDT results to work order								<u>CY 10/3/24</u> <u>(1)</u>
190 	Packaging	0.00							
Packaging	<b>Memo</b>	0.00							
Packaging	Inspect for transit damage Ensure copy of NDT results attached to work order.								<u>P 10/3/24</u> <u>(1)</u>
200 	<u>QC-5</u> QC- Inspect dimensions to drawing	0.00							
QC	<b>Memo</b>	0.00							
Quality Control	Inspect for damage & ensure results are as per Dwg D206-667-145								<u>M 10 03 29</u> <u>(1)</u>

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

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Customer:

Reference:

Approvals: Process Plan: \_\_\_\_\_ Date: \_\_\_\_\_ Tooling: \_\_\_\_\_ Date: \_\_\_\_\_  
QC: \_\_\_\_\_ Date: \_\_\_\_\_ SPC (Y/N): \_\_\_\_\_ Date: \_\_\_\_\_

Run Start



Stop



Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Draw Number	Draw Rev.	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
210		0.00							
	SprayPaint					ml	10	03	29 (1)
SprayPaint	Memo	0.00							
Spray Painting	1-Prime inside and outside crosstube as per QSI 005 4.2								
	2-Paint outside crosstube with White Imron as per QSI 005 4.2								
	PRIME:								
	Start Time: 9:00								
	Fininsh Time: 10:00								
	PAINT:								
	Start Time: 2:00								
	Finish Time: 3:00								
220	QC14- Inspect Spray Paint	0.00							
QC	Memo	0.00							
Quality Control	Then, Wrap in plastic bag to protect from scratches								

1 \_\_\_\_\_ 1003 30

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

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Cust Item ID:

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Customer:

Reference:

Approvals: Process Plan: \_\_\_\_\_ Date: \_\_\_\_\_ Tooling: \_\_\_\_\_ Date: \_\_\_\_\_

Run Start



QC: \_\_\_\_\_ Date: \_\_\_\_\_ SPC (Y/N): \_\_\_\_\_ Date: \_\_\_\_\_

Stop



Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Draw Number	Draw Rev.	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
230		0.00							
	Crosstubes					<i>m</i>	<i>10</i>	<i>03</i>	<i>30</i> (1)
Crosstubes	<b>Memo</b>	0.00							
Crosstubes	1-Install support using 0.03" to 0.06" thick layer of magnobond 6398 per QSI 015. Let cure for 12h after installation and prior to packaging. Note: (3) top holes should be facing up. A/R Magnobond 6398 : <i>112417 exp. 01/2011</i>								
	2-Torque clamps to 80-100 in lb → <i>m 10.03.31</i>								
	3-Install nut plates as per Dwg D407-667-145. Touch-up rivet heads with Imron paint. → <i>m 10.03.31</i>								
240	QC5- Inspect part completeness to step on W/O	0.00							
QC	<b>Memo</b>	0.00							
Quality Control									

*8/10/04/01**(X)*

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

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Customer:

Reference:

Approvals: Process Plan: \_\_\_\_\_ Date: \_\_\_\_\_ Tooling: \_\_\_\_\_ Date: \_\_\_\_\_  
QC: \_\_\_\_\_ Date: \_\_\_\_\_ SPC (Y/N): \_\_\_\_\_ Date: \_\_\_\_\_

Run Start



Stop

Sequence ID/  
Work Center IDOperation  
DescriptionSet Up/  
Run HoursDraw  
NumberDraw  
Rev.Plan  
CodeAccept  
QtyReject  
QtyReject  
NumberInsp.  
Stamp

250

Pick Kit

0.00



Packaging

Memo

0.00

Packaging

10-4-1 SF

260

QC4- 100% Inspect kits for completeness

0.00



QC

Memo

0.00

Quality Control

8 10/04/06

④

270

Packaging

0.00



Packaging

Memo

0.00

Packaging

Identify and pack for shipping as per PPP D407-667-105

Location: \_\_\_\_\_

PPP Rev: C

P004/0 C

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

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Reference:

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QC: \_\_\_\_\_ Date: \_\_\_\_\_ SPC (Y/N): \_\_\_\_\_ Date: \_\_\_\_\_

Run Start



Stop

Sequence ID/  
Work Center IDOperation  
DescriptionSet Up/  
Run HoursDraw  
NumberDraw  
Rev.Plan  
CodeAccept  
QtyReject  
QtyReject  
NumberInsp.  
Stamp

280

QC21- Final Inspection - Work Order Release

0.00



QC

Memo

0.00

Quality Control

10/04/07

MF 10-4-7

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

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# Picklist Print

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Page 1

Work Order ID: 56800

Parent Item: D407-667-105

Parent Item Name: Crosstube Fwd

Comments: IPP Rev:F 05.09.01 Add holes for compatibility with Bell Skidtubes KJ/JLM  
 IPP Rev:G 08-05-16 chg QC6 to QC15 DD verified by:EC  
 IPP Rev:H 08-06-03 update as per DSI9415 (ECN1198) DD verified by:ec  
 IPP Rev:I 08-07-14 add (scribe inside of tube) seq.6 DD verified by:EC

Start Date: 10/03/2010

Required Date: 25/03/2010

Start Qty: 1.00

Required Qty: 1.00

D407-667-105TRN

Manufactured No

110

Each

2.0000

1.0000



Crosstube Turning Detail

## Warehouse

## Loc Qty

## Loc Code

### Location

Main Warehouse

LG

2

55984

1

55985

1

D2856-400-694

Manufactured No

230

Each

0.0000

2.0000



Abrasion Strip

D2873-043

Manufactured No

230

Each

49.0000

2.0000



Nut Plate Assembly

## Warehouse

## Loc Qty

## Loc Code

### Location

Main Warehouse

ST

49

45370

2

45422

1

50871

6

53966

20

56466

20

AWM 10-3-15  
 1/A

W 10.03-31

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

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 IPP Rev:H 08-06-03 update as per DS19415 (ECN1198) DD verified by:ec  
 IPP Rev:I 08-07-14 add (scribe inside of tube) seq.6 DD verified by:EC

Start Qty: 1.00

Required Qty: 1.00

D2873-045 Manufactured No 230 Each 47.0000 2.0000



Nut Plate Assembly

Warehouse	Loc Qty	Loc Code
Location		
Main Warehouse		
ST	47	
45210	3	
50001	4	
<u>53967</u>	20	
53968	20	

ml 10.03.31

D2891-1 Manufactured No 230 Each 75.0000 2.0000



2.25 Support

Warehouse	Loc Qty	Loc Code
Location		
Main Warehouse		
ST	75	
40336	1	
<u>43880</u>	10	
46159	20	
50952	20	
53347	4	
53773	20	

ml 10 03 30

Robber Cushion!  
 D3595-063-395 B# 44667 x4 ml 10.03.30

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Shop Packet Print

Page 2

W/O:		WORK ORDER CHANGES					
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Start Date: 10/03/2010

Required Date: 25/03/2010

Start Qty: 1.00

Required Qty: 1.00

MS20601-AD4W10

Purchased

No

230

Each

143.0000

14.0000



RIVET

## Warehouse

## Loc Qty

## Loc Code

### Location

Main Warehouse

ST322

143

111177

43

113220

100

MS21920-20

Purchased

No

230

Each

95.3000

4.0000



Clamp (per MIL-DTL-8783C)

## Warehouse

## Loc Qty

## Loc Code

### Location

Main Warehouse

LG

95.3

103478

2

106484

12

109269

9.3

110536

10

112307

12

112624

39

112793

11

10-03-31

10-03-30

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

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Work Order ID: 56800

Parent Item: D407-667-105

Parent Item Name: Crosstube Fwd

Comments: IPP Rev:F 05.09.01 Add holes for compatibility with Bell Skid tubes KJ/JLM  
 IPP Rev:G 08-05-16 chg QC6 to QC15 DD verified by:EC  
 IPP Rev:H 08-06-03 update as per DSI9415 (ECN1198) DD verified by:ec  
 IPP Rev:I 08-07-14 add (scribe inside of tube) seq.6 DD verified by:EC

Start Date: 10/03/2010

Required Date: 25/03/2010

Start Qty: 1.00

Required Qty: 1.00

AN5-10A

Purchased

No

250

Each

80.0000

10.0000

Bolt

## Warehouse

## Loc Qty

## Loc Code

### Location

Main Warehouse

ST337

80

107013

8

110363

2

112314

1

113149

1

113524

18

114056

50

AN5-30A

Purchased

No

250

Each

51.0000

4.0000

BOLT

## Warehouse

## Loc Qty

## Loc Code

### Location

Main Warehouse

ST339

51

110467

1

112933

50

March 10, 2010 12:56:06 PM

Shop Packet Print

Page 4

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries

# Picklist Print

March 10, 2010 12:56:06 PM

Page 5

Work Order ID: 56800

Parent Item: D407-667-105

Parent Item Name: Crosstube Fwd

Comments: IPP Rev:F 05.09.01 Add holes for compatibility with Bell Skidtubes KJ/JLM  
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 IPP Rev:H 08-06-03 update as per DSI9415 (ECN1198) DD verified by:ec  
 IPP Rev:I 08-07-14 add (scribe inside of tube) seq.6 DD verified by:EC

Start Date: 10/03/2010

Required Date: 25/03/2010

Start Qty: 1.00

Required Qty: 1.00

AN5-32A

Purchased No

250

Each

236.0000 4.0000

Bolt

## Warehouse

## Loc Qty

## Loc Code

### Location

Main Warehouse

ST340

236

106242

3

106519

4

110363

17

112933

12

113121

100

114056

100

ANS1149DOS632 Q31 017

AN960JD516

Purchased No

250

Each

0.0000 18.0000

Washer

MS21042L5

Purchased No

250

Each

531.0000 4.0000

Nut

## Warehouse

## Loc Qty

## Loc Code

### Location

Main Warehouse

ST300

531

110382

10

111636

1

112314

17

113523

107

113537

196

114108

200

March 10, 2010 12:56:06 PM

Shop Packet Print

Page 5

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

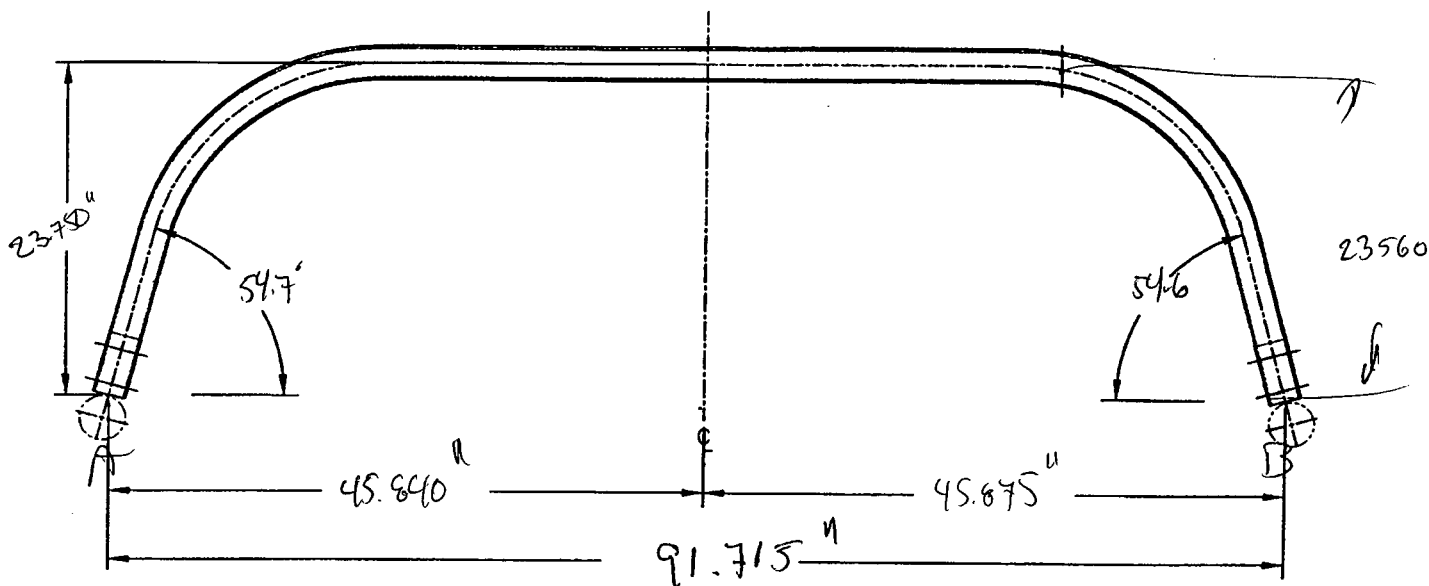
Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

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DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries

<b>DART AEROSPACE LTD</b>		<b>Work Order:</b>	56800
<b>Description:</b> Crosstube High Fwd (407)		<b>Part Number:</b>	D407-667-105
<b>Inspection Dwg:</b> D407-667-145 <b>Rev:</b> C		<b>Page 1 of 1</b>	

Required Dimension	Min	Max
Height	23.41	23.67
1/2 Span	45.81	46.07
Angle	54	56
Total Span	91.63	92.13



Comments
One height is high. Acceptable. CP 10.03.12

QC15 Inspection	S
Date	10/03/12

Rev	Date	Change	Revised by	Approved
A	07.02.06	New Issue	KJ/JM	
B	09.11.12	Dimensions updated per Dwg Rev C	KJ	

Item	Qty -145	Part Number	Description
1	X	D407-667-145	CROSSTUBE ASSEMBLY (407 HIGH FWD)
2	1	D6010-115	CROSSTUBE
3	2	D2873-043	NUT PLATE
4	2	D2873-045	NUT PLATE
5	2	D2891-1	SUPPORT
6	4	D3595-063-395	RUBBER CUSHION
7	4	MS21920-20	CLAMP (OR MS21920-21)
8	14	MS20601AD4W10	RIVET (OR NAS9302B-4-10)
9	A/R	MAGNOBOND 6398	ROCKWELL SPECIFICATION RBO-120-023 ADHESIVE (TEXTRON/BELL SPEC. 299- 947-100, TYPE II, CLASS 2 ADHESIVE)

# **GENERAL NOTES:**

- 1) MATERIAL: MANUFACTURED FROM D6010-115  
FINISHED LENGTH = 113.20±0.020
- 2) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1  
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2  
PAINT OUTSIDE PER DART QSI 005 4.2
- 3) TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED.
- 4) UNITS: INCHES UNLESS OTHERWISE NOTED.
- 5) BREAK SHARP EDGES: 0.005 TO 0.010 MAX.
- 6) IDENTIFICATION: SCRIBE DART PART NUMBER "D407-667-145" AND BATCH NUMBER ON  
INSIDE OF CUFF USING VIBRATING STYLUS.
- 7) WEIGHT: 17.8 lbs
- 8) PART IS SYMMETRIC ABOUT CENTERLINE.
- 9) RUN CUTTER OFF PART WHERE INDICATED. BLEND OUT EDGE LONGITUDINALLY,  
TRANSITION SHOULD BE SMOOTH.
- 10) BEND PROGRESSIVELY WITH A MINIMUM OF 6 PASSES. MAXIMUM TUBE FLATTENING DUE  
TO BENDING IS 6% BASED ON O.D.
- 11) LIQUID PENETRANT INSPECT OUTSIDE SURFACE OF CROSSTUBE PER QSI 038.
- 12) INSTALL D2891-1 SUPPORT USING 0.03" TO 0.06" THICK LAYER OF MAGNOBOND 6398 PER  
QSI 015. LET CURE FOR 12 HOURS AFTER INSTALLATION AND PRIOR TO PACKAGING.
- 13) INSTALL MS21920-20 CLAMPS (OR -21) WITH D3595-063-395 RUBBER CUSHIONS TO SECURE  
THE D2891-1 SUPPORT ON TOP SIDE OF THE CROSSTUBE. ENSURE CLAMP MECHANISMS  
ARE LOCATED ON CROSSTUBE SUPPORTS.
- 14) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE  
OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS  
SCRATCHES, NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT  
LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE.
- 15) TORQUE CLAMPS 80 TO 100 IN-LB. ENSURE AT LEAST 1.5 THREADS ARE SHOWING IN  
SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING.

SHOP COPY  
RETURN TO  
ENGINEERING  
UNCONTROLLED COPY  
SUBJECT TO AMENDMENT  
WITHOUT NOTICE  
WORK ORDER  
NO. 56800

*BJ10-3-10*

**RELEASED**  
08/11/12

C	REVISE GENERAL NOTES/PART LIST (ZN D7-1); REORGANIZED VIEWS AND REFORMATTED DRAWING TO CURRENT STANDARDS. D3595-063-395 WAS D2856-400-694 (ZN D6-2 & A5-2); REMOVED REF. 7 ADD TOLERANCES (ZN C6-3, C4-3, D2-3); RELOCATED FLAG #6 (ZN A8-3) PER NCR 210; MOVED TURNING DETAIL & UPDATED TOLERANCE TO SHEET 4.	RF	08.11.06
B	ADD HOLES AND NUT PLATES FOR COMPATABILITY WITH BHT/AA SKUDTUBES	PH	05.07.26
A	NEW ISSUE	CP	02.05.08
REV.	DESCRIPTION	BY	DATE
DESIGN	<i>90</i>	<b>DART AEROSPACE LTD</b>	
DRAWN	RF	HAWKESBURY, ONTARIO, CANADA	
CHECKED	<i>CP</i>	DRAWING NO.	REV. C
MFG. APPR.	<i>CP</i>	D407-667-145	SHEET 1 OF 4
APPROVED	<i>CP</i>	TITLE	SCALE
DE APPR.	<i>CP</i>	CROSSTUBE ASSY (407 HIGH FWD)	NTS
DATE	08.11.06	COPYRIGHT © 2002 BY DART AEROSPACE LTD THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSE OR COPIED OR COMMUNICATED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD.	

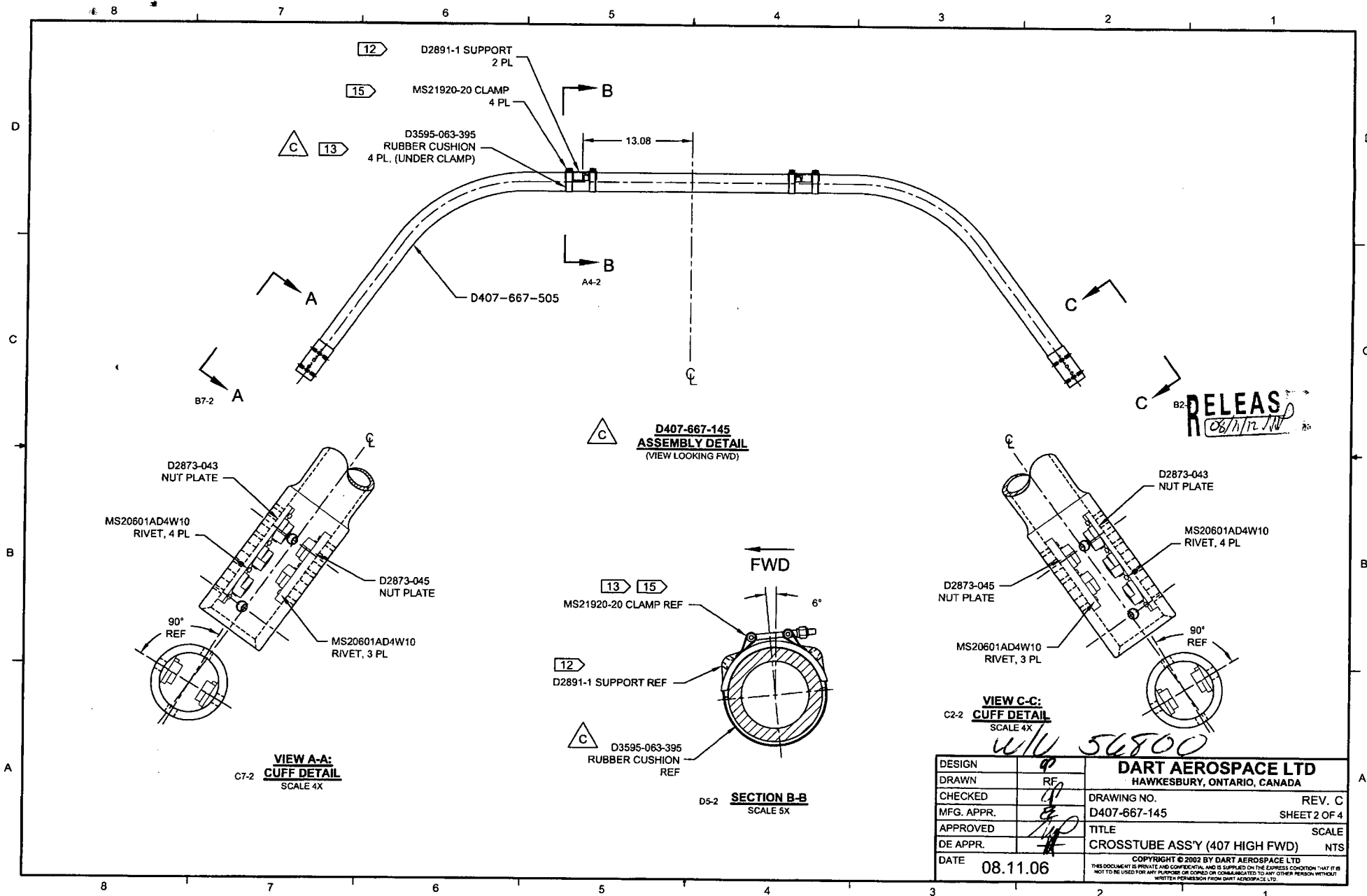
W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

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DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries



DESIGN	407	<b>DART AEROSPACE LTD</b>	
DRAWN	RF	HAWKESBURY, ONTARIO, CANADA	
CHECKED	RF	DRAWING NO.	REV. C
MFG. APPR.	RF	D407-667-145	SHEET 2 OF 4
APPROVED	RF	TITLE	SCALE
DE APPR.	RF	CROSSTUBE ASS'Y (407 HIGH FWD)	NTS
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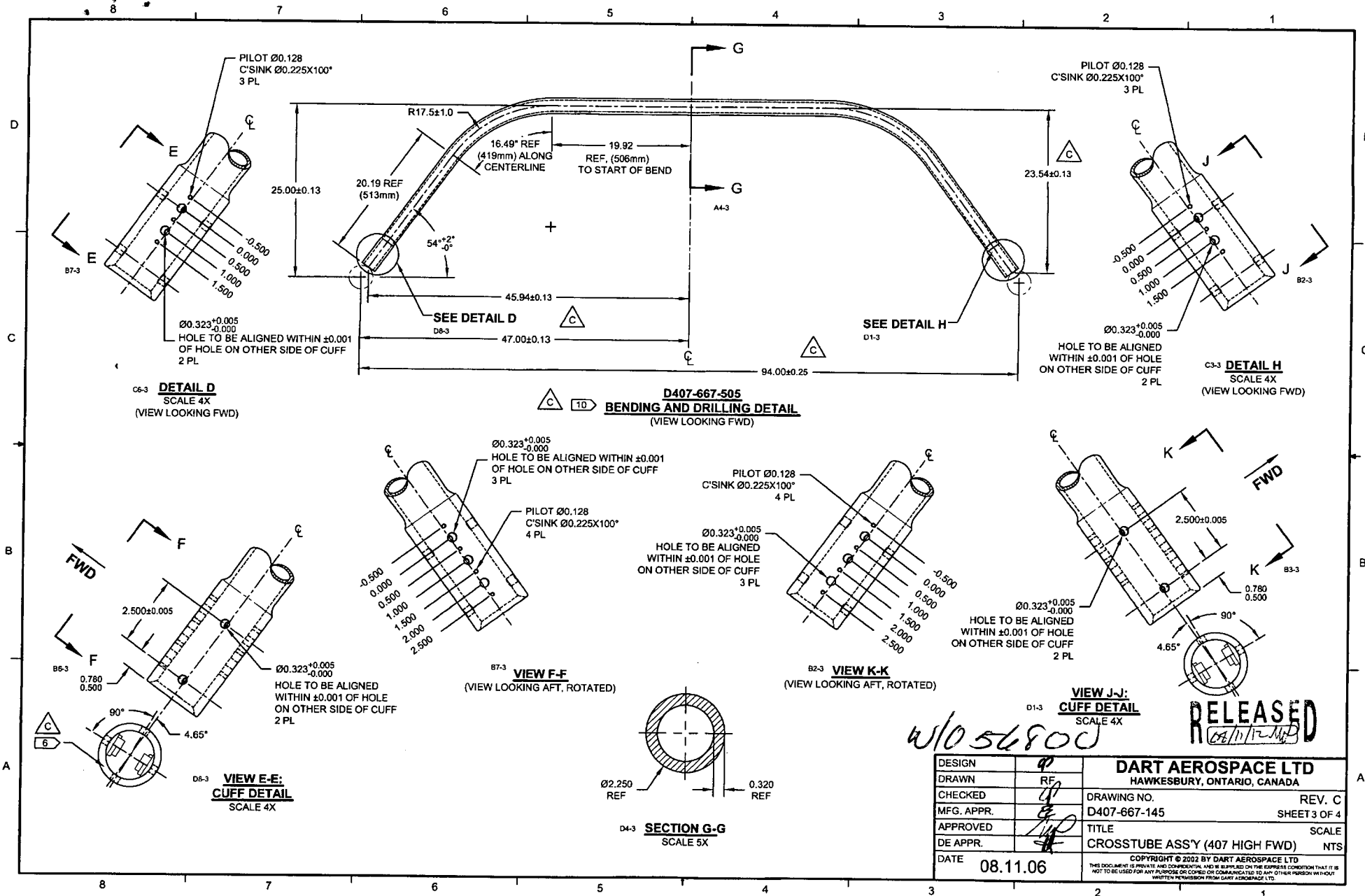
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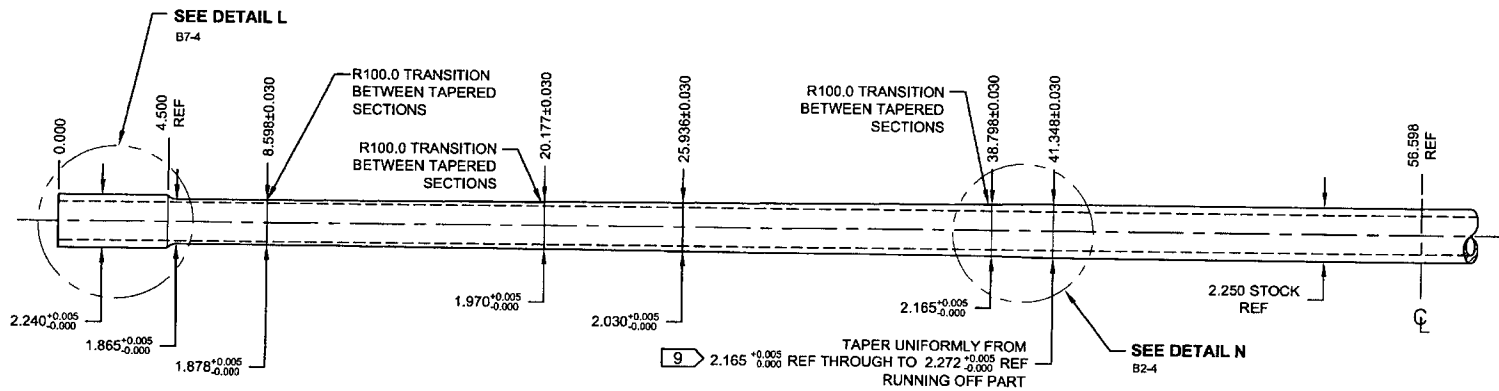
W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

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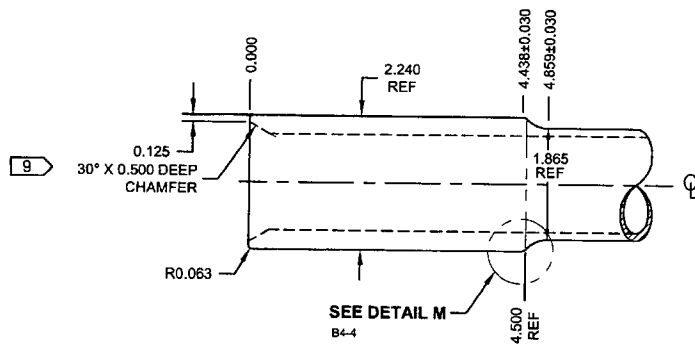
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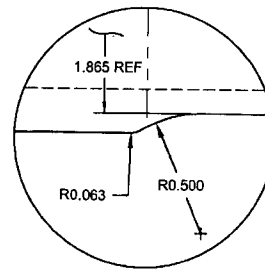
**NOTE:** Date & initial all entries



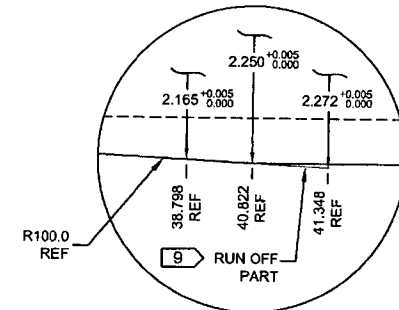
**TURNING DETAIL**



**DETAIL L:  
CROSSTUBE CUFF**  
NOT TO SCALE



**DETAIL M:  
CUFF TRANSITION**  
NOT TO SCALE



**DETAIL N:  
TAPER RUN-OFF**  
NOT TO SCALE

DESIGN	40	<b>DART AEROSPACE LTD</b> HAWKESBURY, ONTARIO, CANADA	
DRAWN	RF		
CHECKED	RF	DRAWING NO.	REV. C
MFG. APPR.	RF	D407-667-145	SHEET 4 OF 4
APPROVED	RF	TITLE	SCALE
DE APPR.	RF	CROSSTUBE ASS'Y (407 HIGH FWD)	NTS
DATE	08.11.06	COPYRIGHT © 2002 BY DART AEROSPACE LTD THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSE OR COMMUNICATED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD.	

**RELEASED**  
08/11/06

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

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DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries

## 5.0 PARTS LIST

Item	Qty -011	Qty -013	Qty -015	Qty -101	Qty -201	Qty -103	Qty -203	Qty -105	Qty -205	Part Number	Description
	X									D206-667-011	SPACER BLOCK KIT
		X								D206-667-013	NUT PLATE KIT (-101/-103/-105/-203/-205)
			X							D206-667-015	NUT PLATE KIT (-201)
				X						D206-667-101	CROSSTUBE INSTALLATION, 206A/B HIGH FWD
					X					D206-667-201	CROSSTUBE INSTALLATION, 206A/B HIGH AFT
						X				D206-667-103	CROSSTUBE INSTALLATION, 206L/L-1/L-3/L-4 HIGH FWD
							X			D206-667-203	CROSSTUBE INSTALLATION, 206L/L-1/L-3/L-4 HIGH AFT
								X		D407-667-105	CROSSTUBE INSTALLATION, 407 HIGH FWD
									X	D407-667-205	CROSSTUBE INSTALLATION, 407 HIGH AFT
1				1						D206-667-141	CROSSTUBE ASSEMBLY, 206A/B HIGH FWD
2					1					D206-667-241	CROSSTUBE ASSEMBLY, 206A/B HIGH AFT
3						1				D206-667-143	CROSSTUBE ASSEMBLY, 206L/L-1/L-3/L-4 HIGH FWD
4							1			D206-667-243	CROSSTUBE ASSEMBLY, 206L/L-1/L-3/L-4 HIGH AFT
5								1		D407-667-145	CROSSTUBE ASSEMBLY, 407 HIGH FWD
6									1	D407-667-245	CROSSTUBE ASSEMBLY, 407 HIGH AFT
10				*2	*2	*2		*2		D2891-1	SUPPORT
11							*2			D2892-1	SUPPORT
12									*1	D2894-1	SUPPORT
13				*2	*2	*2		*2		D2856-400-694	ABRASION STRIP
14							*2		*2	D2856-400-773	ABRASION STRIP
15									*1	D2856-600-851	ABRASION STRIP
16				*4	*4	*4		*4		MS21920-20	CLAMP
17							*4		*4	MS21920-22	CLAMP
18									*2	MS21920-24	CLAMP
19				4	4	4		4		AN5-32A	BOLT
20							4		4	AN5-34A	BOLT
21				4	4	4	4	4	4	MS21042L5	NUT (OR MS21042-5)
22				8	8	8	8	8	8	AN960JD516	WASHER
23									*2	D3190-1	CHAFING SHIELD
30	8									AN4-6A	BOLT
31	8									AN4-7A	BOLT
32	16									AN960JD416	WASHER
33	2									D3193-041	SPACER BLOCK ASSEMBLY
40		2		*2		*2	*2	*2	*2	D2873-043	NUT PLATE
41		2		*2		*2	*2	*2	*2	D2873-045	NUT PLATE
42			2		2					D2872-043	NUT PLATE
43			2		2					D2872-045	NUT PLATE
44		10		10		10				AN5-7A	BOLT
45		10	10		10		10	10	10	AN5-10A	BOLT
46		4	4	4	10	4		4		AN5-30A	BOLT
47		4					4		4	AN5-32A	BOLT
48		18	18	10	12	10	10	10	10	AN960JD516	WASHER
49		4	4		6					MS21042L5	NUT (OR MS21042-5)

\*REFERENCE ONLY. PARTS ARE INCLUDED IN D206-667-141/241/143/243, &amp; D407-667-145/245 ASSEMBLIES ABOVE

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Revision: C

Date: 05.07.26

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

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**NOTE:** Date & initial all entries



# LIQUID PENETRANT TEST REPORT

P- 1532

CLIENT DART AEROSPACE DATE MARCH 26-2010 PAGE 1 OF 1  
ATTENTION LINDA/CHARTEL ACUREN JOB NO. 168-10-0715 TIME AM ☒ P  
ADDRESS 1270 ABELDEN ST. POWO NO. 11550  
HAWKES BURY CN, KGH 1K7 WORK LOCATION SHOP  
PROJECT F. P. I. ON CROSS TUBES ACCEPTANCE STD. ASTM 1417 REV./DATE 200  
ITEM(S) EXAMINED 6 PCS

JOB DESCRIPTION WET FLUORESCENT LIQUID PENETRANT INSPECTION  
PROCEDURE NO. LT-0002 REV./DATE --- TECHNIQUE NO. LT-1412 REV./DATE ---  
PART NO. --- MATERIAL ALUMINUM THICKNESS ---  
SCOPE CARRIED OUT 100% EXTERNAL

## TEST DETAILS

METHOD ☒ FLUORESCENT ☐ VISIBLE  
FAMILY BRAND MAGNAFLUX  
PENETRANT 2LG7 MINIMUM DWELL TIME 45 MIN.  
PENETRANT REMOVER H2O MINIMUM DRY TIME >10 MIN.  
DEVELOPER SKD 52 MINIMUM DWELL TIME 10 MIN.  
DEVELOPER TYPE ☒ NON AQUEOUS ☐ AQUEOUS ☐ DRY  
☒ WATER WASH ☐ SOLVENT REMOVABLE ☐ POST EMUL  
BLACK LIGHT S/N 16459 ☐ OUTPUT > 1000  $\mu$ W/cm<sup>2</sup> ☐ AMBIENT <:  
LIGHTING EQUIP. ☐ FLASHLIGHT ☐ TROUBLELIGHT ☐ OUTPUT > 100 fc @ SL  
OTHER LABINO  
LIGHT METER S/N 1098806 CAL DUE DATE MAY-7-2011

## TEST SURFACE

SURFACE CONDITION ☐ AS GROUND ☐ AS WELDED ☒ MACHINED ☐ SHOT BLASTED ☐ CLEAN BARE METAL  
SURFACE TEMPERATURE ☐ < -4°C/ 20°F ☐ -4°C/ 20°F TO 10°C/ 50°F ☒ 10°C/ 50°F TO 52°C/ 125°F ☐ > 52°C/ 125°F

## RESULTS-

☐ METRIC ☐ IMPERIAL

1 CROSS TUBE, W.O. 56473 ✓  
1 CROSS TUBE, W.O. 56475 ✓  
1 CROSS TUBE, W.O. 56504 ✓  
1 CROSS TUBE, W.O. 56505 ✓  
1 CROSS TUBE, W.O. 56799 ✓  
1 CROSS TUBE, W.O. 56800 ✓

10-03-29

## Scope of Services

The agreement of Acuren Group Inc. to perform services extends only to those services provided for in writing. Under no circumstances shall such services extend beyond the performance of the requested services. It is expressly understood that all descriptions, comments and expressions of opinion reflect the opinions or observations of Acuren Group Inc. based on information and assumptions supplied by the owner/operator and are not intended nor can they be construed as representations or warranties. Acuren Group Inc. is not assuming any responsibilities of the owner/operator and the owner/operator retains complete responsibility for the engineering, manufacture, repair and use decisions as a result of data or other information provided by Acuren Group Inc. In no event shall Acuren Group Inc.'s liability in respect of the services referred to herein exceed the amount paid for such services.

## Standard of Care

In performing the services provided, Acuren Group Inc. uses the degree, care and skill ordinarily exercised under similar circumstances by others performing such services in the same or similar locality. No other warranty, expressed or implied, is made or intended by Acuren Group Inc.

## SIGNATURES

CLIENT REPRESENTATIVE Mattieu Mouchet DTR # E-27370  
TECHNICIAN (SIGNATURE): [Signature] SIGNATURE  
NAME (PRINT): Mike Johnston REPORT REVIEWED BY:  
1<sup>st</sup> TECHNICIAN 2<sup>nd</sup> TECHNICIAN  
CGSB LEVEL 2 SNT LEVEL --- CGSB LEVEL --- SNT LEVEL ---  
CGSB REG. NO. 6666 CGSB REG. NO. ---

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